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## Delimitation and the Suborbital Passenger: Time to End Prevarication

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**DELIMITATION AND THE SUBORBITAL PASSENGER:  
TIME TO END PREVARICATION**

DR. VERNON NASE\*

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"I'm convinced in the next few years we're going to see multiple companies flying several times a week. . . . And that will mean hundreds of launches every year, with thousands of people getting to experience space flight firsthand."<sup>1</sup>

—George Nield, Head of Office of Commercial Space Transportation, Federal Aviation Administration (FAA)

**I**N THE INTRODUCTORY SCENES of the classic movie "Casablanca," the narrator talks about the plight of refugees during World War II waiting in Casablanca to exit French Morocco en route to the United States.<sup>2</sup> "They wait and wait and wait," says the narrator. This article argues against the wisdom of a "wait and see" approach when it comes to developing an appropriate legal regime for suborbital flight. This is particularly so when such flight is for the purpose of transportation from point A to point B on Earth.

As the realization of commercial suborbital flight (first through the good offices of Virgin Galactic) becomes imminent, there is a need to revisit the U.S. position on suborbital flight and a need for an international response. In its absence, there is still opportunity for an industry response to the legal dilemma created by the international community's failure to pinpoint where sovereign airspace gives way to outer space.

## I. DEFINING SUBORBITAL FLIGHT

U.S. domestic legislation has been amended to include "sub-orbital trajectory" in the definitions of "payload," "space transportation services," and "space transportation vehicle."<sup>3</sup>

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<sup>1</sup> Joe Palca, *A New Frontier in Space Travel: The Law*, NPR (July 15, 2011), <http://www.npr.org/2011/07/15/138159514/a-new-frontier-in-space-travel-the-law>.

<sup>2</sup> CASABLANCA (Warner Bros. Pictures 1942).

<sup>3</sup> See Commercial Space Act of 1998, § 2(3), 112 Stat. 2843, 2843 (current version codified at 51 U.S.C. § 50101(2) (2006)) (including "suborbital trajectory" in the definition of "payload"); *id.* § 2(5) (current version codified at 51 U.S.C. § 50101(4)) ("space transportation services" means the preparation of a space transportation vehicle and its payloads for transportation to, from, or within outer space, *or in suborbital trajectory* (emphasis added)); *id.* § 2(6) (current version codified at 51 U.S.C. § 50101(5)) ("[T]he term 'space transportation vehicle' means any vehicle constructed for the purpose of operating in, or transporting a payload to, from, or within, outer space, *or in suborbital trajectory*, and includes any component of such vehicle not specifically designed or adapted for a payload." (emphasis added)); *see also* Commercial Space Launch Act, § 4(2), 98 Stat. 3055, 3056 (1984) (current version codified at 51 U.S.C. § 50902(4)(A) (2006)) (including "suborbital trajectory" in definition of "launch").

However, the issue of a specific altitude at which airspace gives way to outer space is deliberately not addressed. Peter van Fenema defines suborbital flight as “[involving] the launch of an object or objects into outer space without that object or such objects completing one or more orbits around the [E]arth.”<sup>4</sup> Definitions of suborbital flight, although scant in the relevant legal literature, tend to emphasize that the vehicle does reach space and that the vehicle, although intersecting this point, does not complete an entire orbital revolution of the Earth.

## II. THE INEVITABILITY OF SUBORBITAL COMMERCIAL FLIGHT

The Ansari X Prize contributed to the pace of development of technologies able to deliver commercial suborbital flight. In 1996, a prize of \$10 million was offered “to whoever could first launch a privately-funded aircraft into suborbital space twice [within a two-week period] while carrying a pilot and two passengers.”<sup>5</sup> The purpose of the prize, consonant with the Orteig Prize of 1927 won by Charles Lindberg, was to promote the development of commercial space travel.<sup>6</sup> It is well known that Scaled Composites’ SpaceShipOne took the prize by traveling over 100 kilometers in altitude on two occasions with a maximum height reached of 112 kilometers in altitude.<sup>7</sup>

Now, Virgin Galactic is preparing SpaceShipTwo, which will be carried into the air and launched by the WhiteKnight carrier aircraft.<sup>8</sup> It will then climb rapidly until it reaches an altitude around 100 kilometers above mean sea level.<sup>9</sup> Virgin Galactic plans to offer flights on this vehicle to paying passengers, or “space tourists,” at a price of \$200,000 per person.<sup>10</sup> There is a significant number of agents selling tickets and, at the time of

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<sup>4</sup> Peter van Fenema, Note, *Suborbital Flights and ICAO*, Note, 30 AIR & SPACE L. 396, 396 (2005).

<sup>5</sup> Thomas Brannen, Comment, *Private Commercial Space Transportation’s Dependence on Space Tourism and NASA’s Responsibility to Both*, 75 J. AIR L. & COM. 639, 644 (2010).

<sup>6</sup> *Id.*

<sup>7</sup> Press Release, Scaled Composites, SpaceShipOne Flies Again Within 14 Days – Wins \$10M X Prize (Oct. 4, 2004), available at [http://www.scaled.com/news/spaceshipone\\_flies\\_again\\_within\\_14\\_days\\_-\\_wins\\_10m\\_x\\_prize](http://www.scaled.com/news/spaceshipone_flies_again_within_14_days_-_wins_10m_x_prize).

<sup>8</sup> *Overview – Spaceships*, VIRGIN GALACTIC, <http://www.virgingalactic.com/overview/spaceships/> (last visited Oct. 1, 2012).

<sup>9</sup> *See id.*

<sup>10</sup> *Booking*, VIRGIN GALACTIC, <http://www.virgingalactic.com/booking> (last visited Oct. 1, 2012).

writing, there were in excess of 430 bookings.<sup>11</sup> Van Fenema reports that although "SpaceShipOne won the [Ansari X] [P]rize . . . more than twenty other American, Russian, Canadian, British, Romanian[,] and other private competitors continue their efforts to enter space as well."<sup>12</sup> Virgin Galactic is also eyeing the future possibility of fast suborbital passenger flights on long-haul trips; for example, by reducing the in-flight time of the point-to-point (PTP) route between Sydney, Australia, and London to a mere four hours.<sup>13</sup>

XCOR Aerospace has been selected by the National Aeronautics and Space Administration (NASA) "to provide suborbital flight and payload integration services for research and scientific missions in a program that will offer up to \$10 million dollars [sic] in contracts to match payload customers with flight vehicle services."<sup>14</sup> XCOR's Lynx space vehicle has been planned to provide up to four flights a day.<sup>15</sup> The Lynx is also the vehicle of choice for KLM Royal Dutch Airlines' (KLM's) planned suborbital flights, which will operate from a space port located in Curaçao.<sup>16</sup> The U.S. company Rocketship Tours has also teamed with XCOR to offer flights on the Lynx vessel.<sup>17</sup> One of the virtues of Lynx is that it makes a horizontal take-off from a runway, in a manner similar to an aircraft, before curving upward in a rocket-powered ascent.<sup>18</sup> It also lands, as indeed does SpaceShipTwo, on a runway, descending along a glide path to make a horizontal landing.<sup>19</sup> Consequently, there is considerable scope

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<sup>11</sup> See *id.* For example, in the Hong Kong SAR of China, the author's place of domicile, Miramar Travel of Causeway Bay is the authorized agency for bookings. *Id.*

<sup>12</sup> van Fenema, *supra* note 4, at 400.

<sup>13</sup> John Walton, *Virgin Galactic's Suborbital Shuttle: Sydney to London in 4 Hours*, AUSTRALIAN BUS. TRAVELLER, Aug. 5, 2011, available at <http://ausbt.com.au/virgin-galactic-suborbital-shuttle-sydney-london-4-hours>.

<sup>14</sup> Press Release, Cosmica Spacelines, NASA Selects XCOR to Participate in \$10 Million Suborbital Flight Contract (Aug. 12, 2011), available at <http://www.cosmicaspacelines.com/news-and-media/nasa-selects-xcor-to-participate-in-10-million-suborbital-flight-contract-2/>.

<sup>15</sup> *Id.*

<sup>16</sup> Press Release, XCOR Aerospace, KLM Announces Suborbital Flight Relationship with Space Experience Curaçao (Nov. 17, 2010), available at [http://www.xcor.com/press-releases/2010/10-11-17\\_KLM\\_announces\\_suborbital\\_relationship\\_with\\_SXC.html](http://www.xcor.com/press-releases/2010/10-11-17_KLM_announces_suborbital_relationship_with_SXC.html).

<sup>17</sup> *About Us*, ROCKETSHIP TOURS, <http://www.rocketshiptours.com/about-us/> (last visited Oct. 1, 2012).

<sup>18</sup> *Mission Profile, Rocketship Adventures*, INCREDIBLE ADVENTURES, <http://www.incredible-adventures.com/xcor-lynx-flight.html> (last visited Oct. 1, 2012).

<sup>19</sup> See *id.*; see also *Overview – Spaceships*, VIRGIN GALACTIC, *supra* note 8.

for development of such a craft for international transportation of passengers.

Armadillo Aerospace, another U.S. corporation, has designed a novel “Fishbowl Spaceship” that provides space tourists with a 360-degree view of suborbital space.<sup>20</sup> Other corporations planning to offer suborbital travel include Space Adventures Ltd., which nominated Armadillo as its preferred partner, and Masten Space Systems.<sup>21</sup> Masten’s Xaero suborbital vehicle features a vertical take-off and landing.<sup>22</sup> Interestingly, Space Adventures Ltd. also tickets flights that provide a zero-gravity experience on a specially modified Boeing 727 for \$4,950.<sup>23</sup>

In Europe, a European Space Agency (ESA) project aimed at supporting new commercial suborbital spaceflight efforts involves the development of plans for a “Vinci” suborbital vehicle. The Vinci is described as being a space plane “with the appearance of a business jet and . . . propelled by the Vinci rocket engine currently being developed for the upper stage of the European Ariane 5 rocket.”<sup>24</sup> The Vinci space plane is planned to have a horizontal take-off and landing on a runway, making it comparable to the Virgin Galactic and XCOR initiatives.<sup>25</sup>

The marketing advertisements for “space tourism” emphasize that the flights involve “spaceflight.”<sup>26</sup> Even if the experience is better depicted as a space-like experience, those providing suborbital flight are trading on the sexiness of providing a “space travel” experience.

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<sup>20</sup> Rachel Courtland, “Fishbowl” *Spaceships and Giant Stars: Week in Space*, NEW SCIENTIST (Oct. 24, 2008, 8:55 PM), <http://www.newscientist.com/article/dn15039-fishbowl-spaceships-and-giant-stars-week-in-space.html>.

<sup>21</sup> *Partner, Suborbital Spaceflight*, SPACE ADVENTURES, <http://www.spaceadventures.com/index.cfm?fuseaction=suborbital.Providers> (last visited Oct. 1, 2012).

<sup>22</sup> *Suborbital Vehicle Development Updates from Space Access '12*, NEWSPACE J. (Apr. 14 2012, 10:19 AM), <http://www.newspacejournal.com/2012/04/14/suborbital-vehicle-development-updates-from-space-access-12/>.

<sup>23</sup> *Zero Gravity Flights*, SPACE ADVENTURES, [http://www.spaceadventures.com/index.cfm?fuseaction=Zero\\_Gravity\\_Flights.welcome](http://www.spaceadventures.com/index.cfm?fuseaction=Zero_Gravity_Flights.welcome) (last visited Oct. 1, 2012).

<sup>24</sup> Rob Coppinger, *Reusable Space Plane Idea Intrigues Europeans*, SPACE.COM (May 1, 2012, 4:30 PM), <http://www.space.com/15494-vinci-space-plane-suborbital-flight-idea.html>.

<sup>25</sup> *Id.*

<sup>26</sup> See, e.g., *Suborbital Spaceflight*, SPACE ADVENTURES, <http://www.spaceadventures.com/index.cfm?fuseaction=suborbital.welcome> (last visited Oct. 1, 2012) (“Learn about our preferred suborbital spaceflight provider.” “Learn about the suborbital spaceflight experience.” “See who has signed up to fly on our suborbital spaceflight.”).

### III. THE DELIMITATION ISSUE AND THE RIVAL APPROACHES

The point at which sovereign airspace yields to the *res communis* of outer space is elusive and contentious. Despite ongoing debate about where the delimitation line between airspace and outer space ought to be set, there is no agreed position.<sup>27</sup> “[D]espite decades of discussions in the [United Nations] Committee on the Peaceful Uses of Outer Space (UNCOPUOS) and its two [s]ubcommittees on the issue . . . there is as yet no agreed definition of outer space.”<sup>28</sup> At the same time, it must be acknowledged that the UNCOPUOS Legal Subcommittee has continued to emphasize in its discussions the need for “a conventionally defined boundary between air space and outer space.”<sup>29</sup>

The two dominant approaches to setting a delimitation line are the spatialist approach and the functionalist approach.<sup>30</sup> The spatialist approach seeks to define, in a scientific way, the precise point at which airspace gives way to outer space.<sup>31</sup> A range of scientific-based approaches have been advanced over the years. These include: (1) the aeronautical ceiling theory, (2) the Kármán line, (3) the lowest perigee of an orbiting satellite, (4) demarcation based on the Earth’s gravitational effects, and (5) demarcation based on the division of space into layers.<sup>32</sup> Alternatively, the functionalist approach looks at the function of the vessel—whether it is intended to operate in outer space or in airspace—based on the nature and purpose of the activities pursued.<sup>33</sup> Carl Christol explains that “functionalists favor a line determined by the operating capabilities, or ‘flying properties.’”<sup>34</sup> One such proposal made by the Russians in 1979

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<sup>27</sup> van Fenema, *supra* note 4, at 397.

<sup>28</sup> *Id.*

<sup>29</sup> UNCOPUOS, Rep. on its 36th Sess., June 7–18, 1993, ¶ 100, U.N. Doc. A/48/20 (Aug. 16, 1993).

<sup>30</sup> I.H.P.H. DIEDERIKS-VERSCHOOR & V. KOPAL, AN INTRODUCTION TO SPACE LAW 17–19 (3d rev. ed. 2008).

<sup>31</sup> *See id.* at 17–18.

<sup>32</sup> *Id.*

<sup>33</sup> S. Neil Hosenball & Jefferson S. Hofgard, *Delimitation of Air Space and Outer Space: Is a Boundary Needed Now?*, 57 U. COLO. L. REV. 885, 887 (1986).

<sup>34</sup> Carl Q. Christol, 91 AM. J. INT’L L. 577, 578 (1997) (reviewing ROBERT F.A. GOEDHART, *THE NEVER ENDING DISPUTE: DELIMITATIONS OF AIR SPACE AND OUTER SPACE* (1996)).

sought to establish a demarcation line at 110 kilometers above sea level.<sup>35</sup>

The significance of the quest to delimit space is to establish whether a particular object should be classified as an air object or a space object. Within the *lex specialis* of outer space, the Convention on International Liability for Damage Caused by Space Objects (Liability Convention) distinguishes between space objects and aircraft.<sup>36</sup> The Liability Convention applies to "space objects" that a launching state launches, or procures the launch of, into outer space. "Space object" is given only a partial definition in the Liability Convention to include its "component parts . . . as well as its launch vehicle and parts thereof."<sup>37</sup>

Absolute liability applies, under Article II of the Liability Convention, when a space object causes damage to an aircraft in flight or to persons or property on the ground.<sup>38</sup> This is subject, under Article VI, to exoneration where the claimant state has been grossly negligent or has not acted in accordance with international law.<sup>39</sup> When there is a collision in space between space objects, Article III of the Liability Convention applies to determine liability on the basis of fault.<sup>40</sup> In space, there is only state liability, not individual liability, with states being responsible and arguably liable for their national activities and the actions of their corporations under Article VI of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (Outer Space Treaty).<sup>41</sup>

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<sup>35</sup> Secretariat of the Legal Subcomm., UNCOPUOS, *Historical Summary of the Consideration of the Question on the Definition and Delimitation of Outer Space*, 8 nn. 9–10, U.N. Doc. A/AC.105/769 (Jan. 18, 2002) (discussing two Soviet working papers submitted on the delimitation issue in 1979).

<sup>36</sup> Convention on International Liability for Damage Caused by Space Objects, Mar. 29, 1972, 24 U.S.T. 2389, 961 U.N.T.S. 187 [hereinafter *Liability Convention*].

<sup>37</sup> *Id.* art. I.

<sup>38</sup> *Id.* art. II.

<sup>39</sup> *Id.* art. VI.

<sup>40</sup> *Id.* art. III.

<sup>41</sup> Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, art. VI, Jan. 27, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205 [hereinafter *Outer Space Treaty*] (providing that "States Parties . . . shall bear international responsibility for national activities in outer space . . . whether such activities are carried on by governmental agencies or by non-governmental entities . . . . The activities of non-governmental entities . . . shall require authorization and continuing supervision by the appropriate State Party to the Treaty.").



#### IV. THE UNITED STATES' "WAIT AND SEE" APPROACH TO DELIMITATION

The United States is the dominant advocate for the "wait and see" approach to the delimitation issue.<sup>42</sup> This approach decries the need to make a decision due to a total lack of incidents or disputes that raise the issue. The core idea of the approach is that it is prudent to wait until a practical problem occurs before the international community moves to create a common position. This position was outlined at the 40th Session of UNCOPUOS, where the U.S. delegate stated as follows:

Our position continues to be that defining or delimiting outer space is not necessary. No legal or practical problems have arisen in the absence of such a definition. On the contrary, the differing legal regimes applicable in respect of airspace and outer space have operated well in their respective spheres. The lack of a definition or delimitation of outer space has not impeded the development of activities in either sphere.<sup>43</sup>

The role of the U.S. military in the development of this policy, in a historical sense, should not be overlooked. As Delbert Terrill observes, "the Air Force proposed—and the United States adopted—an ad hoc approach to the creation of international outer space law, reasoning that this approach would allow practice and technology to drive the evolution of the law."<sup>44</sup>

At this point in time, however, the point to be made is that things have changed; the technology has evolved, and space tourism is now not merely viable but already a reality. The Russian Federation response to the UNCOPUOS Questionnaire on Possible Legal Issues with Regard to Aerospace Objects provides food for thought in this context, where it observes that "as aerospace technology becomes increasingly sophisticated, the question might arise as to whether the existing provisions of international space and air law need to be supplemented."<sup>45</sup>

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<sup>42</sup> See UNCOPUOS, Legal Subcomm., Unedited Transcript of its 644th Mtg., Apr. 4, 2001, COPUOS/LEGAL/T.644.

<sup>43</sup> *Id.* at 2.

<sup>44</sup> DELBERT R. TERRILL, JR., *THE AIR FORCE ROLE IN DEVELOPING INTERNATIONAL OUTER SPACE LAW* xvi (1999).

<sup>45</sup> Secretariat of the UNCOPUOS, *Questionnaire on Possible Legal Issues with Regard to Aerospace Objects: Replies from Member States*, 5, U.N. Doc. A/AC.105/635/Add.1 (Mar. 15, 1996) [hereinafter *Delimitation Responses*]. This view has been echoed in the comments of states on many occasions. See, e.g., UNCOPUOS, Rep. on its 45th Sess., June 5–14, 2002, 19, U.N. Doc. A/57/20, GAOR, 57th Sess., Supp. No. 20 (2002) (suggesting that "[t]he need for legal certainty . . . had

The present reality is that we stand on the cusp of an era of commercial travel involving suborbital flight that will involve growing numbers of paying passengers.<sup>46</sup> It is inevitable that at some point there will be incidents that will necessitate an identification and application of relevant law.

There is a close analogy with the early days of commercial aviation involving international flight. Because of technological limits, the early aircraft were capable of carrying relatively few passengers. Eventually, the carrying capacity of aircraft developed and larger numbers were carried. Consequently, there was a need to develop an adequate body of law and rules that would apply universally and across all territorial borders. In 1929, the need for a convention governing the liability of air carriers resulted in the creation of the Warsaw Convention.<sup>47</sup> The 2009 collision between the Iridium 33 and the Cosmos 2251 satellites<sup>48</sup> and the damage to Canadian territory caused by Cosmos 954,<sup>49</sup> among other incidents, point to the need for: (1) adequate risk management, (2) aerospace management, and (3) clarity in the applicable law. The Virgin Galactic service requires an international response as earnestly as did the international passenger-carrying services that developed during the late 1920s.

Because the law applicable to suborbital flight is now uncertain, further delay in addressing this issue cannot be justified. Recent developments in suborbital travel now render a reactive

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become more pertinent in view of innovations in the field of space transportation”).

<sup>46</sup> See Frans G. von der Dunk, *Passing the Buck to Rogers: International Liability Issues in Private Spaceflight*, 86 NEB. L. REV. 400, 406 (alluding to Virgin Galactic's plans to launch three flights per day); see also van Fenema, *supra* note 4, at 396 (stating that 30,000 people have expressed interest in suborbital flight on the Virgin Galactic website); Int'l Civil Aviation Org. (ICAO), *Working Paper: Concept of Sub-Orbital Flights*, ¶ 1.4, C-WP/12436 (May 30, 2005) (presented by Secretary General), reprinted in UNCOPUOS, Legal Subcomm., 49th Sess., Mar. 22–Apr. 1, 2010, U.N. Doc. A/AC.105/C.2/2010/CRP.9 (Mar. 19, 2010) (referencing Virgin Galactic's plans to operate a fleet of five suborbital vehicles and the likelihood of other operators providing similar passenger carrying services).

<sup>47</sup> Convention for the Unification of Certain Rules Relating to International Carriage by Air, Oct. 12, 1929, 49 Stat. 3000, T.S. No. 876 [hereinafter Warsaw Convention].

<sup>48</sup> See, e.g., T.S. Kelso, *Analysis of the Iridium 33—Cosmos 2251 Collision*, in 135 AM. ASTRONAUTICAL SOC'Y, ADVANCES IN THE ASTRONAUTICAL SCIENCES 1099 (Anil V. Rao et al. eds., 2010).

<sup>49</sup> See, e.g., Joseph A. Burke, *Convention on International Liability for Damage Caused by Space Objects: Definition and Determination of Damages After the Cosmos 954 Incident*, 8 FORDHAM INT'L L.J. 255, 256 (1984).

approach redundant. To further prevaricate fails even national interests, especially after President Obama has indicated that U.S. policy is now to look to commercial space exploration to provide the impetus for further space-related research and activity.<sup>50</sup>

For suborbital flight that operates mostly or exclusively within U.S. airspace, issues of harmonization and the adoption of an international approach may seem less pressing to some. Alternatively, others may be inclined to view the U.S. approach as both retrograde and unsustainable, especially since PTP flights on Earth will surely follow closely on the development of suborbital “tourist experience” flights.

## V. EXISTING U.S. REGULATION OF SUBORBITAL FLIGHT: INFORMED CONSENT

It must also be acknowledged that the U.S. approach to what we may term regular space transportation of passengers is already in place. The Commercial Space Launch Amendment Act of 2004 (CSA) has defined the law applicable to SpaceShipTwo. Under this statute, passengers on suborbital flights will travel at their own risk.<sup>51</sup> The suborbital “carrier,” by informing the crew and spaceflight participants or passengers of the risks associated with their flight, is able to dispense with the need to insure against liability for passenger injury.<sup>52</sup> Further, the CSA fundamentally “mandates waivers of liability for licensed activities between licensee or transferee with its contractors, subcontractors and customers, and contractors and subcontractors of the customers.”<sup>53</sup>

It seems incomprehensible that such a regime of carrier non-liability to passengers has been adopted where the majority of flight time is spent in airspace. The outer space experience consists of a brief period of weightlessness. “After engine shutdown, [three] to [six] min[utes] of microgravity is achieved [before]

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<sup>50</sup> President Barack Obama, Remarks by the President on Space Exploration in the 21st Century (Apr. 15, 2010) (transcript available at [http://www.nasa.gov/news/media/trans/obama\\_ksc\\_trans.html](http://www.nasa.gov/news/media/trans/obama_ksc_trans.html)) (declaring that “we will partner with industry. We will invest in cutting-edge research and technology.”).

<sup>51</sup> Rebekah Davis Reed, Comment, *Ad Astra Per Aspera: Shaping a Liability Regime for the Future of Space Tourism*, 46 HOUS. L. REV. 585, 595 (2009).

<sup>52</sup> See 49 U.S.C. §§ 70105(b)(5)(A), 70112(b)(1) (2006).

<sup>53</sup> Int’l Astronautical Fed’n (IAF), *Space Passenger Liability*, at 2, IAF Doc. IAC-05-E6.3.04 (2005) (by Stefan Kaiser & Martha Mejia-Kaiser) (emphasis omitted).

the vehicle falls back to Earth and re-enters the atmosphere.”<sup>54</sup> Frans von der Dunk equates the reentry process of SpaceShip-One to “a sycamore leaf floating down” prior to its gliding to a landing.<sup>55</sup> Where the flight’s place of departure and place of destination lies within U.S. territory, this approach arguably may be sustained on a policy basis associated with the encouragement of domestic suborbital space flight.

This places the interest of the “fledgling” industry, however, before the interests of providing fair and equitable compensation to injured passengers. Passengers on domestic air transportation services within the United States are entitled to claims for injury or death in an accident within an unlimited liability environment.<sup>56</sup> This serves to highlight the inequity and inequity of the law applicable to suborbital passengers. And if the next step, after tourist flights takes place, is PTP travel that is international in nature, a comparison with the Montreal Convention’s compensation scheme, capped at 113,100 Special Drawing Rights (SDR) (at today’s rate equivalent to approximately \$174,000),<sup>57</sup> provides food for thought.<sup>58</sup> Under the Montreal Convention, it is also possible for passengers to break through the liability cap where the air carrier has been negligent.<sup>59</sup>

As has been pointed out, suborbital passenger carriers in the United States will not have to insure against passenger claims in the same way that air carriers have to insure against such claims. This is the case despite the fact that suborbital passenger-carrying vessels, as they presently function, spend most of their time in airspace and only an infinitesimally small amount of time in

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<sup>54</sup> Tanja Masson-Zwaan & Steven Freeland, *Between Heaven and Earth: The Legal Challenges of Human Space Travel*, 66 ACTA ASTRONAUTICA 1597, 1599 (2010).

<sup>55</sup> von der Dunk, *supra* note 46, at 405.

<sup>56</sup> See, e.g., M.R. Franks, *Airline Liability for Loss, Damage, or Delay of Passenger Baggage*, 12 FORDHAM J. CORP. & FIN. L. 735, 739–40 (2007).

<sup>57</sup> See Convention for the Unification of Certain Rules for International Carriage by Air art. 21, ¶ 2, May 28, 1999, S. Treaty Doc. No. 106-45, 2242 U.N.T.S. 350 [hereinafter Montreal Convention] (providing that a carrier is not liable for liability above 113,100 SDR if the carrier establishes that it was not negligent).

<sup>58</sup> It is noted that not all commentators endorse the view that PTP travel, such as New York to Tokyo, will become a reality in the near future. See Masson-Zwaan & Freeland, *supra* note 54, at 1600 (“It seems doubtful that tomorrow’s suborbital flight will eventually develop into point-to-point transportation, as Virgin Galactic and others seem to envisage.”). This writer believes that globalization is already creating a passenger cohort that will flock to such travel once it is offered.

<sup>59</sup> See Montreal Convention, *supra* note 57, art. 21, ¶ 2.

suborbital space.<sup>60</sup> On a comparative basis, and even on a commercial basis, this is hard to justify.

During the passage of the CSA in 2004, Congressman DeFazio pleaded with Congress to deal with the issue of the liability provisions that needed to be in place for the protection of passengers. He alluded to the “tombstone mentality” of the FAA in promoting the industry at the expense of passenger protection and begged Congress to consider the aviation analogy.<sup>61</sup> If the passenger waivers under the CSA apply to accidents occurring in airspace prior to reaching suborbital altitude, the iniquities of the present situation are readily apparent. In an actuarial sense, it may be argued that an accident is more likely to occur during the time a craft is in airspace, which is more than 95% of flight time, rather than during the suborbital phase.

## VI. IS THE UNITED STATES RECONSIDERING ITS POSITION?

Within the published reports of the FAA, there is at least some evidence of a growing awareness of the issues of passenger safety and liability protection and the need for the FAA to be proactive in the interest of safety. The recommendations section of an October 2006 report on commercial space launches acknowledges the need for the FAA “to be proactive about safety, rather than responding only after a fatality or serious incident occurs.”<sup>62</sup> Although this statement is made in the context of passenger safety, it ought to be applicable to passenger protection. Where you have regular passenger transportation, which is surely the objective of Virgin Galactic and others planning to provide regular suborbital flights, the inevitability of accidents exists. The argument most often cited is that outer space is so dangerous that we cannot afford to provide protection at the expense of the embryonic industry. However, this argument is no more valid for suborbital flight today than it was for passenger flights on aircraft in 1929 when the Warsaw Convention was established.<sup>63</sup>

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<sup>60</sup> See, e.g., Brannen, *supra* note 5, at 653.

<sup>61</sup> See 108 Cong. Rec. H10,049–51 (daily ed. Nov. 19, 2004) (statement of Rep. Peter DeFazio).

<sup>62</sup> U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-07-16, COMMERCIAL SPACE LAUNCHES: FAA NEEDS CONTINUED PLANNING AND MONITORING TO OVERSEE THE SAFETY OF THE EMERGING SPACE TOURISM INDUSTRY 40 (2006).

<sup>63</sup> See Andreas F. Lowenfeld & Allan I. Mendelsohn, *The United States and the Warsaw Convention*, 80 HARV. L. REV. 497, 499 (1967). This seminal article ex-

## VII. THE FAA "POINT-TO-POINT COMMERCIAL SPACE TRANSPORTATION" REPORT CONCESSIONS

A March 2010 FAA report notes the importance of airspace traffic management and that "no single federal agency currently has total responsibility for the operations of U.S. commercial flights in space."<sup>64</sup> Acknowledging that both "space-related laws" and aviation regulations "do not include consideration of suborbital PTP transportation," the report asserts that "there is not a consistent, comprehensive body of law addressing the related issues."<sup>65</sup> However, the report also acknowledges the pivotal role of the International Civil Aviation Organization (ICAO) in regulating "international flights of civil aircraft to facilitate the safe and orderly development of civil aviation and to establish international air transport services."<sup>66</sup> The report notes the need for the FAA to work with "international partners," which the author takes to include ICAO, to create "harmonize[d] standards and procedures."<sup>67</sup>

Arguably, the report's reference to the initial role of bilateral air services, or PTP services agreements, suggests the first and most profound step to be taken to regularize international PTP air and suborbital services. The report states that "in the initial stages of PTP operation, issues and regulations might be resolved with bi-lateral agreements between countries that are origin/destination and/or overflight stakeholders."<sup>68</sup> The author would add that a bilateral international PTP agreement to establish and regulate PTP services between two countries and to subject them to the rule of air law does make sense.

Would it then be possible for the states signing such an agreement to suspend the application of the space treaties so that air law regulates the whole of the journey? Could they also successfully specify under such an agreement that the Montreal Convention of 1999 determines the liabilities of air carriers to passengers? The Vienna Convention on the Law of Treaties' (Vienna Convention's) general rules of interpretation under Ar-

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plores the balancing of interests between industry protection and passenger protection that provided the basis for the presumed liability of air carriers back in 1929.

<sup>64</sup> U.S. DEP'T OF TRANSP., POINT-TO-POINT COMMERCIAL SPACE TRANSPORTATION IN NATIONAL AVIATION SYSTEM: FINAL REPORT 7 (2010).

<sup>65</sup> *Id.* at 8–9.

<sup>66</sup> *Id.* at 9.

<sup>67</sup> *Id.*

<sup>68</sup> *Id.*

ticle 31, Paragraph 3(a) allow consideration of “[a]ny subsequent agreement between the parties regarding the interpretation of the treaty or the application of its provisions.”<sup>69</sup> Article 41 of the Vienna Convention adds weight to the view that the states of departure and destination of PTP travel, in concluding a bilateral PTP air services agreement, may specify air law to apply to “accidents” occurring during flight through the suborbital zone. Article 41 provides that “[t]wo or more of the parties to a multilateral treaty may conclude an agreement to modify the treaty as between themselves alone.”<sup>70</sup> This is the case as long as the modification is either provided for by the treaty or it does not affect the other parties’ rights under the convention or derogate from the effective execution of the object and purpose of the treaty.<sup>71</sup> Article 41 is expressly referring to multilateral treaties, so it has relevance to modification of the various space treaties.

Whether, in a technical sense, this could be used to suspend those treaties’ operation in the suborbital zone is a point worthy of contemplation. There are possibilities presented in this approach, given that outer space is an area of state responsibility, and given that we are contemplating only two states in PTP travel who have agreed to the application of air law. Further, the private international law liability of air carriers to passengers is quite separate from the public international law liability of states.

### VIII. NO MAN IS AN ISLAND

The position on suborbital tourism in Europe is somewhat different from that in the United States. There is significant support in the European Union (EU) states for a core involvement of the aviation agencies of the EU in the regulation of space tourism. The recommendations section of an April 2008 ESA position paper on privately-funded suborbital spaceflight included the following statement:

[The] ESA should contribute in the development of a regulatory frame for [s]pace [t]ourism in Europe, involving both civil aviation regulatory authorities and competent bodies from the [European Council], aiming also at a more level playing field for all

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<sup>69</sup> Vienna Convention on the Law of Treaties art. 31, ¶ 3(a), May 23, 1969, 1155 U.N.T.S. 331 [hereinafter Vienna Convention].

<sup>70</sup> *Id.* art. 41.

<sup>71</sup> *Id.*

worldwide players, and supporting the interests of European industry.<sup>72</sup>

Because we are dealing with many countries in one continent, the surety of international carriage being involved in European-based suborbital ventures demands a unified and international response.<sup>73</sup> Where it has been predicted that the cost of suborbital passenger travel may drop to “\$50,000 [per ticket] with roughly 16,000 passengers . . . [by] 2021,” it is apparent that in the relatively near future, there will be a significant number of passengers being carried on regular passenger flights.<sup>74</sup> These flights will most likely be conducted by a number of carriers. Issues of potential liability to passengers ought not to be overlooked in planning for this.

Jeff Foust notes that European officials have questioned whether suborbital flight is really a spaceflight “from a regulatory point of view.”<sup>75</sup> This is because most of the applicable regulation relates to its transit of airspace in launch and return phases. The implication is that if one accepts that international air law applies across the board, then so too should the existing liability regime as between air carrier and passenger be applied.

Tanja Masson-Zwaan observes that “[t]he legal regime governing aviation is very detailed . . . in terms of liability, registration, jurisdiction, traffic and transit rights, certification of aircraft and crew.”<sup>76</sup> This is equally so for domestic carriage by air in terms of issues, such as the rules of the air, air traffic control, and the myriad of regulations that manifest both within the international regime and domestic regimes and that derive from the Chicago Convention annexes.<sup>77</sup> The greatest degree of uniformity in rules is found in the liability of air carriers to passengers under the international legal regime where the Warsaw or Montreal Conventions on air carrier liability are determinative.

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<sup>72</sup> EUROPEAN SPACE AGENCY, ESA’S POSITION ON PRIVATELY-FUNDED SUBORBITAL SPACEFLIGHT 3 (2008), available at [http://esamultimedia.esa.int/docs/gsp/Suborbital\\_Spaceflight\\_ESA\\_Position\\_Paper\\_14April08.pdf](http://esamultimedia.esa.int/docs/gsp/Suborbital_Spaceflight_ESA_Position_Paper_14April08.pdf).

<sup>73</sup> See Masson-Zwaan & Freeland, *supra* note 54, at 1601.

<sup>74</sup> Andrés Gálvez & Géraldine Naja-Corbin, *Space Tourism: ESA’s View on Private Suborbital Spaceflights*, 135 ESA BULL. 19, 20 (2008).

<sup>75</sup> Jeff Foust, *How High is Space?*, SPACE REV. (Aug. 10, 2009), <http://www.the-spacereview.com/article/1436/1>.

<sup>76</sup> Tanja Masson-Zwaan, *Regulation of Sub-Orbital Space Tourism in Europe: A Role for EU/EASA?*, 35 AIR & SPACE L. 263, 265 (2010).

<sup>77</sup> See *Annexes to the Convention on International Civil Aviation*, ICAO, [http://www.icao.int/Documents/annexes\\_booklet.pdf](http://www.icao.int/Documents/annexes_booklet.pdf) (last visited Oct. 1, 2012).



What is clear is that the ESA sees the need for the “civil aviation regulatory authorities of the countries concerned and the competent agencies of the European Union [to be] at the forefront of the setting up of a regulatory framework for space tourism.”<sup>78</sup> Where the regulatory framework is likely to come from air law, it is a small step to also integrate suborbital carrier liability with that provided under air law.

The author strongly agrees with the following words of Stefan Kaiser and Martha Mejia-Kaiser, and, at the risk of taking liberties with their words, sees them as applying to all jurisdictions: “Fostering this emerging industry will require passenger protection rather than a risk-taking attitude.”<sup>79</sup>

#### IX. HAS CUSTOMARY LAW CRYSTALLIZED ON THE DEMARCATION ISSUE?

Despite the non-emergence of a unified approach to delimitation after decades of discussion and surveys, there is an argument that a customary law has emerged from state practice; however, whether there is only an evident trend or a customary rule of international law remains open to discussion.

The evidence of a crystallizing rule of customary law setting the delimitation line between airspace and outer space at 100 kilometers above mean sea level consists of the following:

- the Australian Space Activities Act 1998, Section 8, specifying outer space as being “an area beyond the distance of 100 kilometers above mean sea level”,<sup>80</sup>
- the South African Republic Space Affairs Act of 1993, Section 1, which defines outer space as being “the space above the surface of the [E]arth from a height at which it is in practice possible to operate an object in an orbit around the [E]arth,” namely an area above 100 kilometers;<sup>81</sup>
- the FAA conferring of astronaut wings on those who have travelled beyond 100 kilometers (or 62.5 miles) in height;<sup>82</sup>

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<sup>78</sup> Gálvez & Naja-Corbin, *supra* note 74, at 22.

<sup>79</sup> Kaiser & Mejia-Kaiser, *supra* note 53, at 5.

<sup>80</sup> *Space Activities Act 1998* (Cth) s 8 (Austl.).

<sup>81</sup> *Space Affairs Act 84 of 1993* § 1 (S. Afr.).

<sup>82</sup> See, e.g., *Active Commercial Space Licenses*, FAA, [http://www.faa.gov/data\\_research/Commercial\\_space\\_data/current\\_licenses/](http://www.faa.gov/data_research/Commercial_space_data/current_licenses/) (last modified Feb. 18, 2009). The only derogation from this approach was NASA's decision to award astronaut wings to test pilots who had flown aircraft higher than fifty miles in altitude. This served to provide belated and symbolic recognition of the contribution made by these pilots, who flew the rocket-powered X-15 in the early 1960s. Press Release,

- the Fédération Aéronautique Internationale (FAI), the world governing body for air sports, criterion for space flight being any flight over 100 kilometers in altitude;<sup>83</sup>
- some responses to the UNCOPUOS survey on aerospace planes suggesting that several states pragmatically regard 100 kilometers as the delimitation line;<sup>84</sup> and
- a contemporary study by the International Academy of Astronautics (IAA) acknowledging that the point of reentry into national airspace occurs at 100 kilometers above mean sea level.<sup>85</sup>

A Russian response to the UNCOPUOS Questionnaire on the Possible Legal Issues with Regard to Aerospace Objects is worthy of consideration. Russia suggested that, “[a]ccording to international practice which is now evolving, a [s]tate’s sovereignty does not extend to the space located above the orbit of least perigee of an artificial Earth satellite (approximately 100 [kilometers] above sea level).”<sup>86</sup> This lends support to the crystallization of a spatialist delimitation line at the 100-kilometer (above mean sea level) mark. It has to be noted that the results of this survey, first circulated in 1996, are circumscribed by the technical developments in aerospace objects pertinent to that moment in time.

Even so, there is support in the responses for an application of air law as the key regulatory element for such objects. The distinction needs to also be made between liability to passengers and the regulation of flight through observance of the rules of the air or navigational and communication requirements imposed under the Chicago Convention annexes. It is acknowledged that the application of the regulatory elements of air law, during transit through airspace, does not automatically translate to subjecting the carrier to liability to passengers under air law if

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NASA, NASA Honors High Flying Space Pioneers (Aug. 23, 2005), available at [http://www.nasa.gov/home/hqnews/2005/aug/HQ\\_05233\\_X-15\\_pilots\\_honored.html](http://www.nasa.gov/home/hqnews/2005/aug/HQ_05233_X-15_pilots_honored.html).

<sup>83</sup> FÉDÉRATION AÉRONAUTIQUE INTERNATIONALE [FAI], STATUTES OF THE FAI Preamble (2012).

<sup>84</sup> For example, Russia favored the 100-kilometer line, the orbit of least perigee, while Germany alluded to entry below 100 kilometers in altitude as “re-entry into the Earth’s atmosphere.” von der Dunk, *supra* note 46, at 425 (citing UNCOPUOS, *Questionnaire on Possible Legal Issues with Regard to Aerospace Objects: Replies from Member States*, U.N. Doc. A/AC.105/635 (Feb. 15, 1996)); see also *Delimitation Responses*, *supra* note 45, at 6 (categorically indicating a ceiling at the 100-kilometer point and a crystallization of the law).

<sup>85</sup> von der Dunk, *supra* note 46, at 427.

<sup>86</sup> *Delimitation Responses*, *supra* note 45, at 6.

an accident occurs in the disputed delimitation zone, for example, somewhere between ninety and 120 kilometers in altitude.

Seemingly adopting a functionalist approach, the Czech Republic response distinguishes between vessels designed for deep space and those that are the focus of this inquiry—the ones that essentially and fundamentally operate in airspace. “The norms of national and international air law would be applicable only to those aerospace objects which would be capable of serving the purposes of aeronautics not to those aerospace vehicles which would be essentially considered as space objects.”<sup>87</sup>

## X. A PRAGMATIC RESPONSE

It may be possible to argue that a customary rule of law setting a delimitation line at 100 kilometers above mean sea level has finally crystallized. Even if this argument is unsustainable, pragmatically it may be desirable to treat suborbital commercial, passenger-carrying flight (in which the main center of operations is airspace) as subject to air law for the purposes of carrier liability to passengers.

This pragmatic approach has advantages in terms of legal clarity for both passenger and carrier. It also provides certainty in terms of which body of law and authorities will regulate the flights and determine liabilities if an accident were to occur, namely air law and ICAO for international carriage. Simple amendments to domestic law may pave the way for this to occur, i.e., to provide suborbital passengers with access to the liability provisions of the Montreal Convention of 1999.<sup>88</sup>

## XI. THE WAY FORWARD

In 1986, S. Neil Hosenball, former General Counsel of NASA, wrote that “until the need for such a boundary is clearly illustrated by the operation of the vehicle, it is premature to impose one.”<sup>89</sup> Such a policy may have taken root in the 1980s and 1990s. However, regular commercial flights into suborbital space suggest the need for either a pragmatic approach that applies air law to the whole of the journey or clarity through the provision of a delineation line and a clear legal statement about applicable private international law. As the volume of flights ramps up, accidents are inevitable. Consequently, the needs of

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<sup>87</sup> *Id.* at 10.

<sup>88</sup> Montreal Convention, *supra* note 57, art. 17.

<sup>89</sup> Hosenball & Hofgard, *supra* note 33, at 892–93.

passengers are much greater than those of us who wait for scientific finality or perfection in this area. It is necessary to provide a human response to what ultimately will be a human problem: compensation to the injured under the applicable convention in the event of an accident. It is arguable that the current U.S. approach of “fly at your own risk” is perhaps more appropriate for space tourism into deep space. The suborbital experience is different in kind and duration from that experienced by Denis Tito and the other space tourists who stayed on the International Space Station or Mir.<sup>90</sup>

Kaiser and Mejia-Kaiser make the point that the “Commercial Space Launch Amendment Act of 2004 cannot serve as an international model for space passenger protection” and that it is better seen as an interim regime.<sup>91</sup> They also rightly assert that a “commercial manned spaceflight . . . industry will require [a level of] passenger protection.”<sup>92</sup> While they are wary of simply applying the regime governing international air travel—namely the Warsaw or Montreal Conventions—the application of these aviation conventions to suborbital flight does provide a realizable solution.

With a contentious delimitation line and an activity that only just transcends aviation, it is better to apply the aviation solution. If it is desirable to create a new liability regime for suborbital carriage, it, in essence, may still amount to a mirror image of the liability regime that applies in airspace. All things being equal, the simplest solution may well be the best.

ICAO has already asserted itself as the body to regulate international suborbital flight. In any event, the rules of the air<sup>93</sup> apply to the carrier aircraft of SpaceShipTwo, as do the Chicago Convention annexes and the myriad of regulatory elements stemming from them, including air traffic control, navigation, meteorological, flight planning and scheduling, and so on. In the interim, before there is sufficient state support for formal treaty-making in this context, the carriers themselves might unilaterally declare that they will observe the Montreal Convention liability limit and rules and not dispute jurisdiction if a claim with respect to international carriage is made against them

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<sup>90</sup> See Patrick E. Tyler, *Space Tourist, Back From “Paradise,” Lands on Steppes*, N.Y. TIMES, May 7, 2001, at A3.

<sup>91</sup> Kaiser & Mejia Kaiser, *supra* note 53, at 5.

<sup>92</sup> *Id.*

<sup>93</sup> ICAO, INTERNATIONAL STANDARDS: RULES OF THE AIR, ANNEX 2 TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION (10th ed. 2005).

under the Montreal Convention. This would facilitate settlement of passenger claims in the event of an accident without the need for litigation.

In essence, the major part of the suborbital journey of SpaceShipTwo (or similar vehicles) is in airspace, and there is a mere kissing of outer space for a few precious minutes. In such circumstances, there is a strong argument that air law should apply for the whole of the trip. A decision to do so would have the following advantages:

- it is practical given the preponderance of regulations under ICAO, the Chicago Convention and its annexes, and standards that are applicable to the journey and the carrier aircraft;
- ICAO is in the best position to integrate the traffic management and navigational elements for international carriage;
- a tried and tested liability regime applies under the Montreal or Warsaw Conventions;
- insurance would be attainable for carriers because of the limitation of liability incorporated in the conventions;
- it can be achieved by agreement without the need for states to assemble for a major diplomatic conference; and
- it provides an appropriate level of passenger protection for mass transportation and avoids conflicting with basic human rights and constitutional provisions.<sup>94</sup>

On this last point, the International Air Transport Association (IATA) intercarrier agreements arguably provide a model. It is necessary to touch on the history of these agreements to better elucidate this argument. When the United States threatened to withdraw from the Warsaw Convention because of its miserly liability limits, the Montreal Intercarrier or Interim Agreement (MIA) of 1965 saved the day.<sup>95</sup> With IATA carriers voluntarily raising the limits to a certain level and waiving their defenses under the convention up to that level, given that an accident

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<sup>94</sup> See Anita Khosla, Note, *Warsaw Convention Limitation on Liability: The Need for Reform After Coccia v. Turkish Airlines*, 11 FORDHAM INT'L L.J. 132, 135 (1987) (discussing *Coccia v. Turkish Airlines*, where the court adjudged that the miserly Warsaw Convention limits conflicted with the guarantee of the rights of man enshrined in Article 2 of the Italian Constitution).

<sup>95</sup> See GEORGE N. TOMPKINS, JR., *LIABILITY RULES APPLICABLE TO INTERNATIONAL AIR TRANSPORTATION AS DEVELOPED BY THE COURTS IN THE UNITED STATES* 10 (Pablo Mendes de Leon ed., 2010). The MIA is legitimized by Article 22, Paragraph 1 of the Warsaw Convention which provides that "by special contract, the carrier and the passenger may agree to a higher limit of liability." Warsaw Convention, *supra* note 47, art. 22, ¶ 1.

under Article 17 had occurred, the United States was placated and withdrew its repudiation of the convention. Further inter-carrier agreements in the mid-1990s also paved the way for an eventual consolidation and revision of the convention system in the Montreal Convention of 1999. This is the only waiver that ought to be applicable to suborbital flight in the view of this author.

Personally, I believe that this activity today is basically an aeronautical activity. . . . It's taking place in . . . airspace. . . . The fact that it may go for a few minutes above 100 kilometres is [sic] altitude is accessory to a larger activity taking place in airspace. I believe that this would not justify the application of space law, at least as we know the activity today.<sup>96</sup>

It is highly arguable that this approach should apply to PTP travel between, for example, New York and Tokyo. However, even if this approach were adopted it still begs the need to provide legal clarity on the issue of the altitude at which airspace ends and outer space begins. This requires an UNCOPUOS recommendation, embodied in a United Nations General Assembly resolution, to the effect that states enact or amend domestic legislation on space to implement their international obligations under Article VI of the Outer Space Treaty and to declare the agreed limitation point between airspace and outer space.

If the passenger liability problem is not addressed, there will be an inevitable furor when the families of passengers killed in the first major incident are met by resistance on the part of a carrier and recourse is made to the passenger waiver. In reality, once the outcry eventuated, compensatory payments would likely be made voluntarily to preserve the reputation of the carrier. It is far better, however, to plan for compensation now lest events overtake us due to our inaction. To characterize either PTP international travel or suborbital space tourism as the domain of the rich fails to address the future of this kind of carriage and the inevitability of it opening up to more and more people, not all of whom can reasonably carry the risk. In the relationship between passenger rights and the industry's need for protection, a balance must be struck that is fair to civil society.

Congressman DeFazio was right. The answer does lie in the aviation analogy.

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<sup>96</sup> Foust, *supra* note 75 (quoting André Farand, Head of the Launchers and Exploration Legal Matters Office of the European Space Agency).



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